

# 3R—A PROGRAM TO SAVE OUR NATION'S HIGHWAYS

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## SOME HIGHWAY SYSTEMS DETERIORATING LIKE RAILWAYS

Would you be alarmed to hear that our highways are in real danger of following the same path to deterioration our railroads have taken over the past several decades? Perhaps people from the southern and western parts of the country where railroads are in relatively good condition would not see this as a serious concern. But I can assure you it presents a frightening picture to those of us from the northeast. Billions of dollars are now being poured into programs to revitalize northeast railroads in an attempt to rectify years of neglect. Hopefully, this effort will be successful but even with this enormous investment, success is by no means assured. We must learn from this experience and not allow our highways to suffer the same fate.

Many of you responsible for operating a highway or street system, I am sure, have detected a similar pattern in the gradual deterioration of your roadways as annual budgets for capital improvements either decrease or at best remain constant while costs are continually rising. As an example of the seriousness of this situation, the Maine Department of Transportation performed a study a few years ago and determined that with the funds expected to be available for reconstruction it would only be possible to rebuild any given section of highway to presently required standards every 235 years.<sup>1</sup> Quite obviously, this is unacceptable.

## A SHIFT FROM HIGHWAY CONSTRUCTION TO PRESERVATION

Faced with this problem, many highway agencies have been shifting the emphasis of their program from projects involving new construction

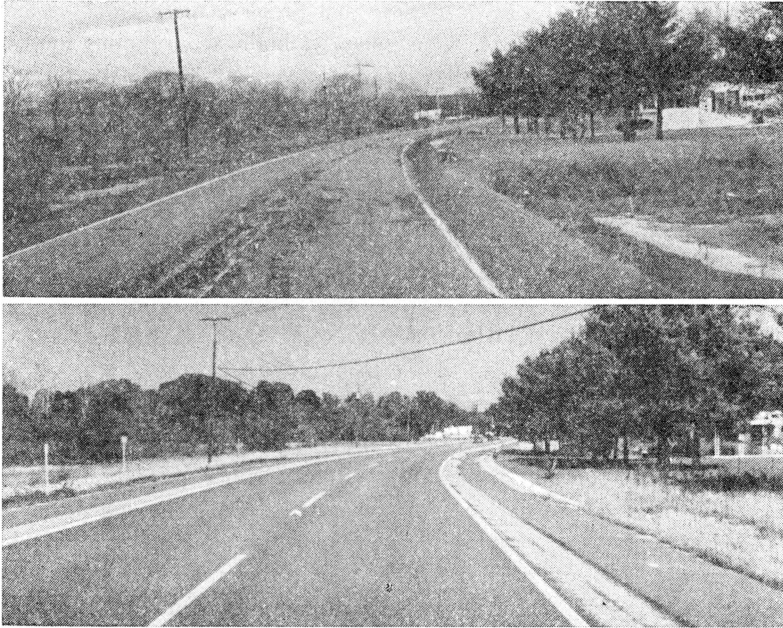
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<sup>1</sup> Richard A. Luetlich, deputy commissioner, Maine Department of Transportation, *Cost Effective Design Policies and Standards*, presented at the 60th Annual Meeting of American Association of State Highway and Transportation Officials, Detroit, Michigan, November 20, 1974.

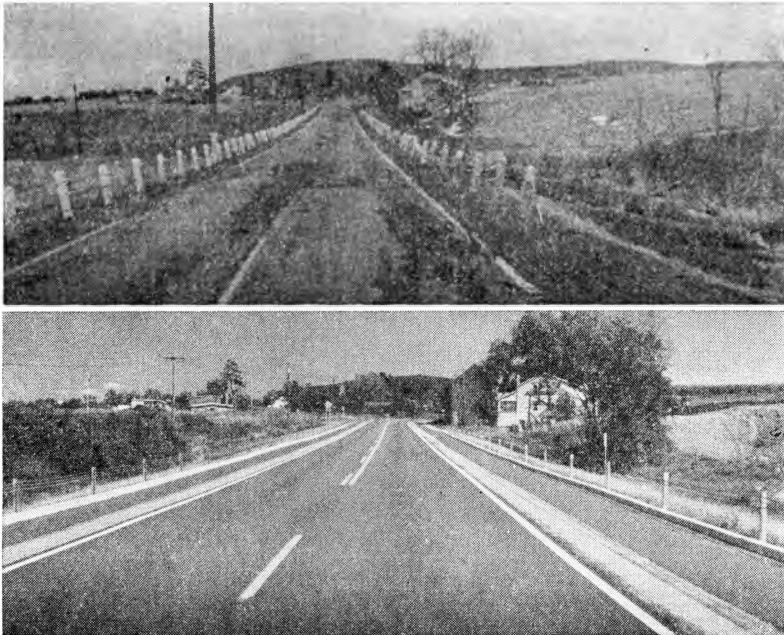
or major reconstruction toward those that preserve the existing system, making it safe and efficient. Consequently, highway programs increasingly consist of numerous smaller-scale improvements specifically tailored to meet identified problems. Examples of such projects which as a result of the 1976 Highway Act came to be classified as 3R include pavement widening and resurfacing, intersection improvements, safety upgrading, and bridge widening and rehabilitation. These have proven to be cost-effective projects which effectively and economically meet the identified needs and result in safer and significantly improved facilities.

### NEW YORK'S REHABILITATION AND PRESERVATION PROGRAM

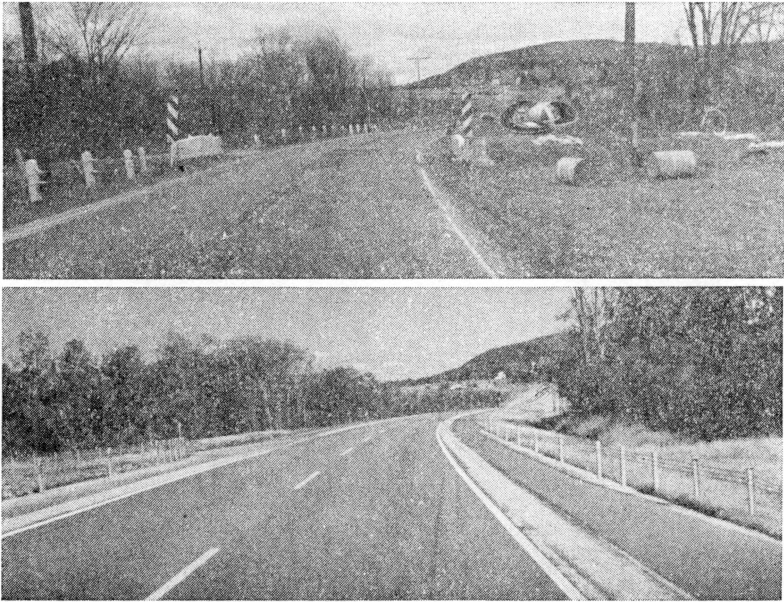
In New York, we recognized this problem several years ago and began allocating an average of \$75 million per year to a program we called rehabilitation and preservation (R&P). Since no federal-aid was available because we were not reconstructing these highways to AASHTO geometric standards, they had to be financed wholly with state funds. This program has been quite successful. During a three-year period (1974, 1975, and 1976) we upgraded approximately 1,000 miles of primary and secondary highways. Figures 1 through 8 show before and after pictures of some of our R&P projects. They are individual frames from a photolog film with runs made just prior to rehabilitation and immediately after completion. These pictures demonstrate quite graphically the tremendous improvements possible even though current AASHTO standards for reconstruction are not obtained.



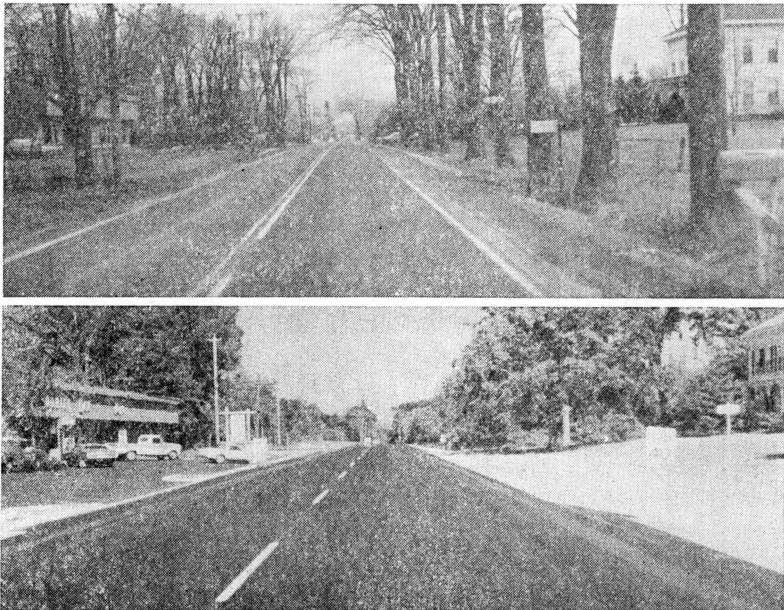
**Figure 1. Pavement, Shoulder, and Guiderail Improvements**



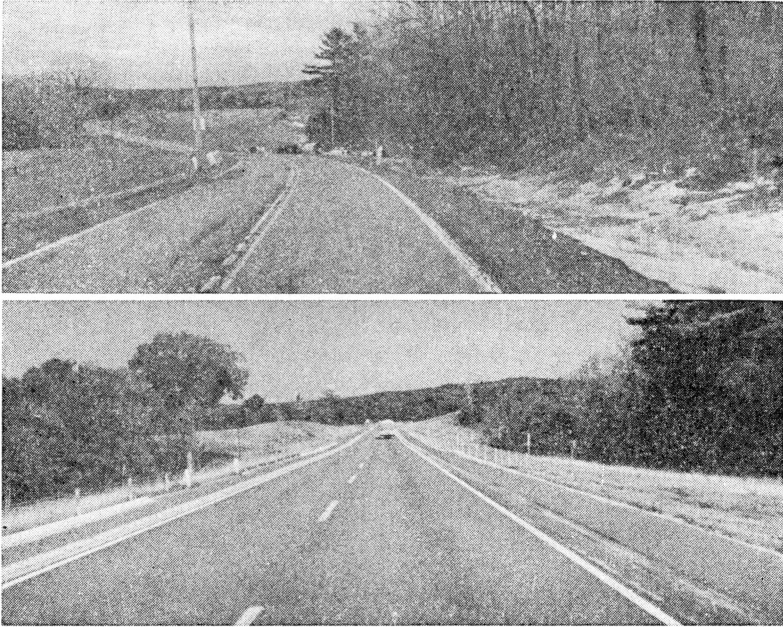
**Figure 2. Pavement, Shoulder, and Guiderail Improvements**



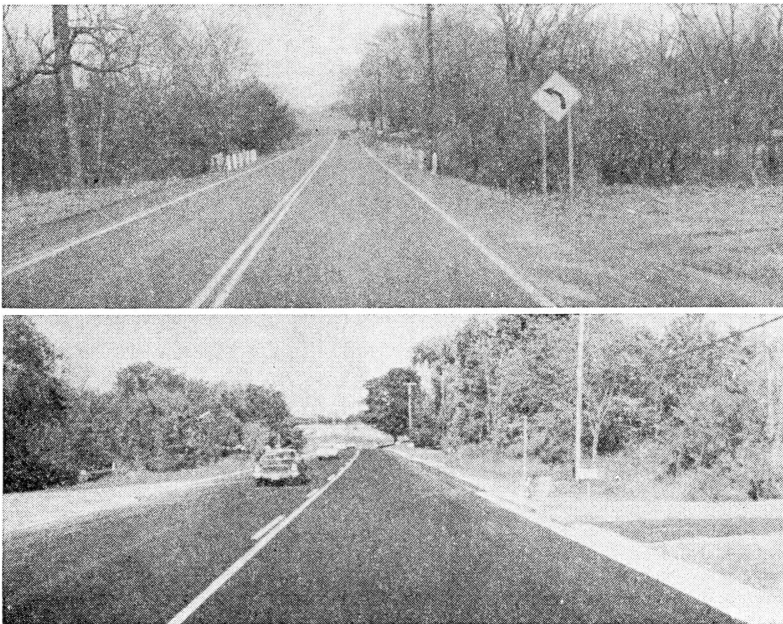
**Figure 3. Pavement and Safety Improvements including Elimination of Hazardous Bridge**



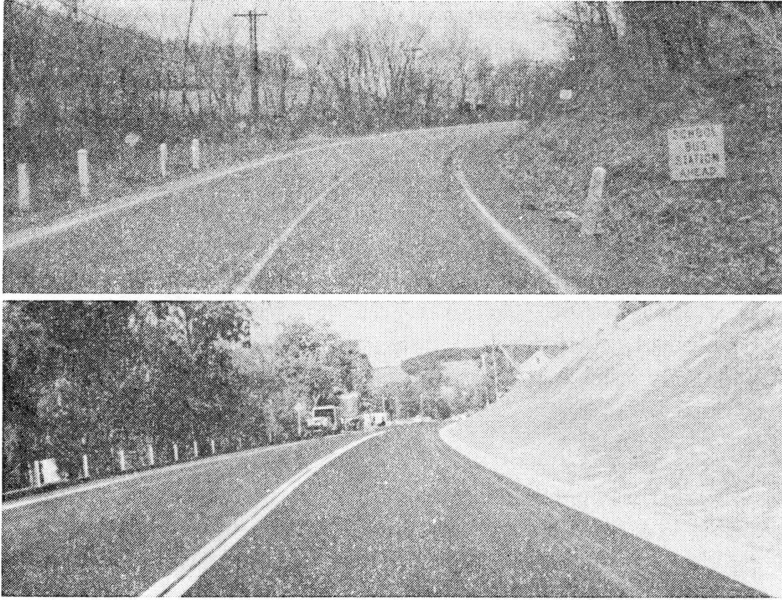
**Figure 4. Pavement and Safety Improvements including Elimination of Hazardous Trees**



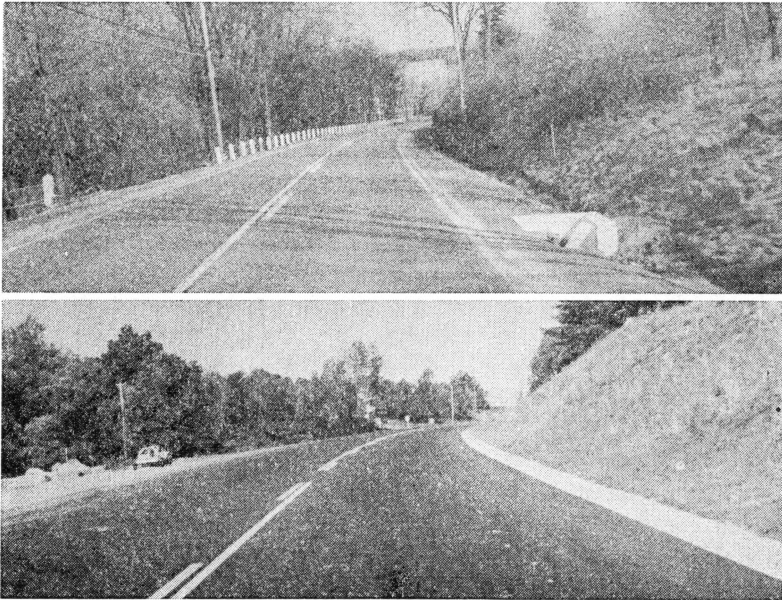
**Figure 5. Elimination of Hazardous Curves as Part of Improvement**



**Figure 6. Elimination of Hazardous Curve as Part of Improvement**



**Figure 7. Improved Sight Distance Permits Elimination of School Bus Sign**



**Figure 8. Elimination of Hazardous Drainage Structure in Ditch as Part of Improvement**

### *New York's Pavement Resurfacing Falling Behind Yearly*

In spite of this program we have evidence to show that the rate at which we are improving our system has been insufficient to produce an overall improvement in pavement condition. For the last few years we have been evaluating the entire state highway system annually by means of roadmeters. For those unfamiliar with a roadmeter, it is a device placed in the trunk of an automobile and instrumented to record the vertical movement of the rear axle. Through a process of computation and correlation, a rating between 0 and 5 is obtained for any section of road over which it is run. The greater the movement of the axle (rougher the pavement) the lower the rating with 5 being perfectly smooth and 0 impossibly rough. Actually, values above 4.5 and below 0.5 are rarely experienced.

### *Pavement Rideability Index (PRI) Dropping*

Each year we find an increase in the percentage of our system reaching the point where resurfacing is necessary. For example, in comparing the results of our 1976 survey with 1975 we found the mean rating of the pavement rideability index dropped 0.5 to a value of 3.49. Further, in the candidate category ( $PRI < 2.4$ ) in which pavements should be programmed for resurfacing the accumulated mileage increased from 1,089 in 1975 to 2,038 in 1976 (6.7% to 12.6% of the system). In the essential category ( $PRI < 1.5$ ) representing pavements whose restoration is overdue, the accumulated mileage increased from 1,138 in 1975 to 1,834 in 1976 (7% to 11.3% of the system). These are net changes reflecting all corrective actions occurring over the intervening year and show that almost 25% of our 15,000 mile system should be programmed for resurfacing. We estimate that a minimum of \$150 million per year must be allocated to rehabilitation projects on New York state highways just to stay even—to keep our system at its present level of rideability. There is no way this amount of state funds can be allocated to highway rehabilitation. It is essential that some means be found to use federal aid for such projects.

### **HIGHWAY ACT OF '76—FEDERAL-AID FOR 3R PROJECTS**

Fortunately, Congress recognized the seriousness of this situation and in the Highway Act of 1976 specifically redefined construction to include resurfacing, restoration, and rehabilitation, thus, the origin of the term 3R. This change in definition of construction was aimed specifically at permitting small scale improvements required to extend the useful life of highways very similar to our R&P program, but with federal aid.

Exactly what each of these "R's" encompasses is subject to individual interpretation but there is no question that as a group they include everything from pavement resurfacing alone to projects involving considerable capacity and safety improvement.

## SOME NEW YORK EXPERIENCES WITH FEDERAL AID FUNDS

### *Federal Funds Granted when AASHTO Standards Modified*

Through the foresight and cooperation of our Federal Highway Administration division staff we were able, a year or so before passage of the 1976 Highway Act, to obtain federal aid for some projects which contained certain features not meeting AASHTO standards. They recognized that not only were funds insufficient to keep the system at an acceptable level of safety and rideability, but in many cases, the social, environmental, and economic impacts on communities and abutting properties were such that it was just not feasible to bring older roads up to required AASHTO geometric standards. However, the current limits of local FHWA authority permit only certain exceptions to standards on a case-by-case basis. This procedure, although helpful, does not go far enough. We are finding, in many cases, that the minimum standards they are able to approve still result in tremendous organized resistance to a project among people who live along the highway.

### *A Case Where Federal Funds Not Granted*

For example, last year we proposed to reconstruct a two-lane rural highway through a suburban village. Lane width and shoulder requirements to obtain federal aid necessitated the removal of several large, mature trees and moving utility poles back toward houses. I happen to be personally acquainted with this project since it is located in the village adjacent to where I live and I represented our department at the public hearing. The turn-out was enormous, over 300 people, including many of my friends and acquaintances. After a long, hot, emotional evening of listening to threats and complaints, it was evident to us there was no way we were going to cut down these trees or move utility poles back onto the front lawns of these rather expensive homes without a court battle. Had we been operating with 3R guidelines as I believe Congress intended, we would have been able with federal aid to modify shoulder widths with little sacrifice in safety and at the same time overcome objections of local residents. Fortunately, in this instance we had enough state funds to proceed with the project in just that manner so that everyone, except the Federal Highway Administration,



is very pleased with this project. In the future, however, state dollars will likely not be available for such a simple solution.

*New Construction Standards Can Be Excessively Costly*

In other instances, in order to obtain federal funds, we have reconstructed roads to new construction standards with the result that costs have been double what would have been necessary to accomplish a reasonable rehabilitation. This is hardly the most cost-effective way of allocating dollars from a fixed capital budget in order to obtain maximum mileage of improvements. The money we invested in this project would have permitted us to rehabilitate an additional highway of equivalent length had we been permitted to modify standards appropriately.

NEW STANDARDS FOR NATIONWIDE 3R PROGRAMS DEVELOPED

In order to effectively undertake a 3R program nationwide on state and county highways and city streets, it was evident that new standards would have to be developed which would apply specifically to this type of work. Consequently, about two years ago, a task force of the AASHTO Design Subcommittee, of which I am a member, was assigned the responsibility for preparing such standards as an addition to its assignment to upgrade and combine the blue book, "A Policy on Geometric Design of Rural Highways," and red book, "A Policy on Design of Urban Highways and Arterial Streets."

NEW AASHTO PUBLICATION—GEOMETRIC DESIGN GUIDE FOR 3R PROJECTS

After a year in preparation and approval by the AASHTO Standing Committee on Engineering and Operations (now Standing Committee on Highways) and member states, a special publication entitled, "Geometric Design Guide for Resurfacing, Restoration, and Rehabilitation (R-R-R) of Highways and Streets" (purple book) was issued by AASHTO in March, 1977. In this guide we have attempted to provide as much flexibility as possible so that the standards used on any particular project can be tailored to fit actual field conditions. This guide generally presents minimum values that are considered acceptable with the thought that judgment will be used by the designer to exceed these minima when this can be achieved on a project at reasonable cost. It is not intended that minimum values be adhered to in every situation, but it does permit using them when to do otherwise would be excessively expensive or environmentally unacceptable. It is explicit in this

guide that the designer will increase the standards in the direction of and, in some cases, perhaps obtain the standards applicable for new construction (AASHTO blue book or red book) where this can be achieved without unduly increasing costs or causing excessive environmental damage.

*Limited Sight Distance—A Rehabilitation Problem*

One of the difficulties we encountered early in our rehabilitation program was an inability to either provide adequate stopping sight distance or warn the driver that such a situation existed. There has never been an official sign for this purpose. We faced this situation in many areas where it wasn't feasible to attempt to change grades and curvature to obtain recommended stopping sight distance. I am very pleased that the AASHTO 3R guide makes provisions for this condition with a new approved sign which reads "LIMITED SIGHT DISTANCE" supplemented with an advisory speed plate to inform drivers that sight distance is less than the recommended value. Figure 9 shows a prototype of this sign erected along a rural highway.



Figure 9.

## “SAFETYCRATS” OPPOSE 3R GUIDE

After publication, the purple book was submitted to the Federal Highway Administration for its acceptance to permit states to start using these standards on federal aid projects. As is customary in such situations, the Federal Highway Administration printed a notice of proposed rulemaking for the 3R standards in the Federal Register August 25, 1977, to provide an opportunity for interested parties to comment. As it turned out, there was a great deal of comment. Highway agencies and others who understood the problem and reasons for new standards urged acceptance of the 3R guide. However, a substantial amount of adverse comment was received, mostly from misguided “safetycrats” in Washington. I have used the word “safetycrats” to describe a group of people in and out of government, mostly in Washington, whose sole objective seems to be forcing adherence to a series of empirical safety standards regardless of the social, environmental, or economic consequences. Unfortunately, these individuals and organizations are unable to appreciate that the use of the 3R guide will result in a substantial overall net increase in the safety of our highway systems because available funds can be spread over many more miles of highway.

## FHWA REFUSES TO APPROVE AASHTO 3R GUIDE

As a result of the adverse comments, FHWA withdrew on January 13, 1978, action on its proposal for amending geometric design standards for 3R projects. Not only is this action seriously affecting state plans for 3R projects but it is serving to thwart the intent of the Congress. The Conference Report which clarifies the 1976 Highway Act clearly states:

“The addition of the word ‘resurfacing’ will make clear that federal aid funds may be used to restore existing roadway pavements to a smooth, safe, usable condition even though further reconstruction is not feasible. ‘Resurfacing’ may be expected to include strengthening pavement, replacement of malfunctioning joints, pavement undersealing, and similar operations necessary to assure adequate structural support for the new surface course.

“The definition as amended, coupled with the secretary’s existing authority on standards, would permit federal funding of such projects as: resurfacing or widening and resurfacing of existing rural and urban pavements with or without revision of horizontal or vertical alinement or other geometric features.”

These statements make it quite evident that Congress intended to permit federal aid to be used to rehabilitate highways without necessarily bringing all features of the road up to standards required for new construction.

## SUMMARY

In presenting to you this chronology of events over the last few years, I hope I have succeeded in explaining not only what 3R is but what great benefits it can bring and how desperately it is needed. AASHTO fully appreciates all this. Congress seemed to have a very clear understanding when it worded the 1976 Highway Act. Unfortunately, this was not understood by all and the result is FHWA's refusal to approve AASHTO's 3R guide. We are hopeful that with urging and minor modifications FHWA will soon be able to accept our 3R standards so we can get on with the job of upgrading our highway systems in the only way we can afford. If this does not happen, the highway systems in the country will indeed suffer the same fate as the northeast railroads and slip steadily toward a state of deterioration from which only a massive infusion of money can save them.